

Lab experiment 4: Install and configure DNS

AIM:

To create and configure DNS Server

DESCRIPTION:

DNS Server

A DNS server is a computer server that contains a database of public IP addresses and their associated hostnames, and in most cases, serves to resolve, or translate, those common names to IP addresses as requested.

Port No: 53

Package name: bind9

Configuration file: /etc/bind/named.conf. (Primary configuration file),/etc/bind/db.root (root nameservers)

PROCEDURE:

CASHING NAMESERVER

When configured as a caching nameserver BIND9 will find the answer to name queries and

remember the answer when the domain is queried again.

1. Install bind9 by typing

```
$sudo apt install bind9
```

```
$sudo apt install dnsutils
```

2.The default configuration is set up to act as a caching server. All that is required is simply

adding the IP Addresses of your ISP's DNS servers. Simply uncomment and edit the following in /etc/bind/named.conf.options:

3.Restart it by typing

```
$sudo systemctl restart bind9.service
```

PRIMARY MASTER

As a primary master server BIND9 reads the data for a zone from a file on it's host and is authoritative for that zone.

Forward zone file

To add a DNS zone to BIND9, turning BIND9 into a Primary Master server, the first step is to edit /etc/bind/named.conf.local:

```
$sudo cp /etc/bind/db.local /etc/bind/db.example.com
```

```
$sudo systemctl restart bind9.service
```

Reverse Zone File

Now that the zone is set up and resolving names to IP Addresses, a *Reverse zone* needs to be added to allows DNS to resolve an address to a name.

1. Edit /etc/bind/named.conf.local

2. Now create the /etc/bind/db.192 file:

```
$sudo cp /etc/bind/db.127 /etc/bind/db.192
```

3. edit /etc/bind/db.192 changing the basically the same options as /etc/bind/db.example.com:

4.After creating the reverse zone file restart BIND9:

```
$sudo systemctl restart bind9.service
```

5.Check the status

```
$Sudo service bind9 status
```

6.Check if nslookup can resolve

```
$nslookup ftp.example.com
```

```
$nslookup ubuntu.example.com
```

7.Gather information about your DNS server

```
$dig ubuntu.example.com
```

```
$dig www.example.com
```

```
$dig ftp.example.com
```

RESULT:

```
root@UBUNTU: /home/ubuntu22

libreoffice-ogltrans libwp6-1.0-1 libwp6backend-fdo-1.0-1 linux-image-6.2.0-26-generic linux-modules-6.2.0-26-generic
linux-modules-extra-6.2.0-26-generic
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  bind9-dnsutils bind9-host bind9-libs bind9-utils
Suggested packages:
  bind-doc resolvconf
The following packages will be upgraded:
  bind9 bind9-dnsutils bind9-host bind9-libs bind9-utils
5 upgraded, 0 newly installed, 0 to remove and 214 not upgraded.
Need to get 1,078 kB of archives.
After this operation, 6,144 B of additional disk space will be used.
Do you want to continue? [Y/n] y
Ign:1 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 bind9 amd64 1:9.18.24-0ubuntu0.22.04.1
Err:1 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 bind9 amd64 1:9.18.24-0ubuntu0.22.04.1
403 Forbidden [IP: 192.168.0.1 8090]
Ign:2 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 bind9-utils amd64 1:9.18.24-0ubuntu0.22.04.1
Err:2 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 bind9-utils amd64 1:9.18.24-0ubuntu0.22.04.1
403 Forbidden [IP: 192.168.0.1 8090]
Ign:3 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 bind9-host amd64 1:9.18.24-0ubuntu0.22.04.1
Err:3 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 bind9-host amd64 1:9.18.24-0ubuntu0.22.04.1
403 Forbidden [IP: 192.168.0.1 8090]
Ign:4 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 bind9-dnsutils amd64 1:9.18.24-0ubuntu0.22.04.1
Err:4 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 bind9-dnsutils amd64 1:9.18.24-0ubuntu0.22.04.1
403 Forbidden [IP: 192.168.0.1 8090]
Err:5 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 bind9-libs amd64 1:9.18.24-0ubuntu0.22.04.1
403 Forbidden [IP: 192.168.0.1 8090]
E: Failed to fetch http://192.168.0.1:8090/ips/block/webcat?cat=68&pl=0&lu=0&url=aHR0cDovL2ludmFyY2hpdnUudWJ1bnR1LnNvbS91YnVudHuvVGV9
vbc9YmVudl2l2vbmVud2KvYmVud2DlF0S4xOC4yNC0wdWJ1bnR1MC4yMl4wNC4xX2FtZDY0LmRlYg== 403 Forbidden [IP: 192.168.0.1 8090]
E: Failed to fetch http://192.168.0.1:8090/ips/block/webcat?cat=68&pl=0&lu=0&url=aHR0cDovL2ludmFyY2hpdnUudWJ1bnR1LnNvbS91YnVudHuvVGV9
vbc9YmVudl2l2vbmVud2KvYmVud2KtdXRpbHNF0S4xOC4yNC0wdWJ1bnR1MC4yMl4wNC4xX2FtZDY0LmRlYg== 403 Forbidden [IP: 192.168.0.1 8090]
E: Failed to fetch http://192.168.0.1:8090/ips/block/webcat?cat=68&pl=0&lu=0&url=aHR0cDovL2ludmFyY2hpdnUudWJ1bnR1LnNvbS91YnVudHuvVGV9
vbc9YmVudl2l2vbmVud2KvYmVud2Ktag9df85LjE4LjI0LTB1YnVudHuwLjIyLjA0LjFFYmVudHuvVGV9 403 Forbidden [IP: 192.168.0.1 8090]
E: Failed to fetch http://192.168.0.1:8090/ips/block/webcat?cat=68&pl=0&lu=0&url=aHR0cDovL2ludmFyY2hpdnUudWJ1bnR1LnNvbS91YnVudHuvVGV9
vbc9YmVudl2l2vbmVud2KvYmVud2KtdXRpbHNF0S4xOC4yNC0wdWJ1bnR1MC4yMl4wNC4xX2FtZDY0LmRlYg== 403 Forbidden [IP: 192.168.0.1 8090]
E: Failed to fetch http://192.168.0.1:8090/ips/block/webcat?cat=68&pl=0&lu=0&url=aHR0cDovL2ludmFyY2hpdnUudWJ1bnR1LnNvbS91YnVudHuvVGV9
vbc9YmVudl2l2vbmVud2KvYmVud2KtdXRpbHNF0S4xOC4yNC0wdWJ1bnR1MC4yMl4wNC4xX2FtZDY0LmRlYg== 403 Forbidden [IP: 192.168.0.1 8090]
E: Unable to fetch some archives, maybe run apt-get update or try with --fix-missing?
root@UBUNTU: /home/ubuntu22#
```

```
root@UBUNTU: /home/ubuntu22

Unpacking bind9-utils (1:9.18.24-0ubuntu0.22.04.1) over (1:9.18.18-0ubuntu0.22.04.2) ...
Preparing to unpack .../bind9-host_1:9.18.24-0ubuntu0.22.04.1_amd64.deb ...
Unpacking bind9-host (1:9.18.24-0ubuntu0.22.04.1) over (1:9.18.18-0ubuntu0.22.04.2) ...
Preparing to unpack .../bind9-dnsutils_1:9.18.24-0ubuntu0.22.04.1_amd64.deb ...
Unpacking bind9-dnsutils (1:9.18.24-0ubuntu0.22.04.1) over (1:9.18.18-0ubuntu0.22.04.2) ...
Preparing to unpack .../bind9-libs_1:9.18.24-0ubuntu0.22.04.1_amd64.deb ...
Unpacking bind9-libs:amd64 (1:9.18.24-0ubuntu0.22.04.1) over (1:9.18.18-0ubuntu0.22.04.2) ...
Setting up bind9-libs:amd64 (1:9.18.24-0ubuntu0.22.04.1) ...
Setting up bind9-utils (1:9.18.24-0ubuntu0.22.04.1) ...
Setting up bind9 (1:9.18.24-0ubuntu0.22.04.1) ...
named-resolveconf.service is a disabled or a static unit not running, not starting it.
Setting up bind9-host (1:9.18.24-0ubuntu0.22.04.1) ...
Setting up bind9-dnsutils (1:9.18.24-0ubuntu0.22.04.1) ...
Processing triggers for ufw (0.36.1-4ubuntu0.1) ...
Rules updated for profile 'Samba'

Processing triggers for man-db (2.10.2-1) ...
Processing triggers for libc-bin (2.35-0ubuntu3.4) ...
root@UBUNTU: /home/ubuntu22# sudo apt install dnsutils
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libreoffice-ogltrans libwp6-1.0-1 libwp6backend-fdo-1.0-1 linux-image-6.2.0-26-generic linux-modules-6.2.0-26-generic
  linux-modules-extra-6.2.0-26-generic
Use 'sudo apt autoremove' to remove them.
The following packages will be upgraded:
  dnsutils
1 upgraded, 0 newly installed, 0 to remove and 213 not upgraded.
Need to get 3,916 B of archives.
After this operation, 1,024 B of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu jammy-updates/universe amd64 dnsutils all 1:9.18.24-0ubuntu0.22.04.1 [3,916 B]
Fetched 3,916 B in 1s (7,263 B/s)
(Reading database ... 241469 files and directories currently installed.)
Preparing to unpack .../dnsutils_1:9.18.24-0ubuntu0.22.04.1_all.deb ...
Unpacking dnsutils (1:9.18.24-0ubuntu0.22.04.1) over (1:9.18.18-0ubuntu0.22.04.2) ...
Setting up dnsutils (1:9.18.24-0ubuntu0.22.04.1) ...
root@UBUNTU: /home/ubuntu22#
```

Activities Terminal Jun 13 14:11 root@UBUNTU: /home/ubuntu22

```
 nano 6.2 /etc/bind/named.conf.options
options {
    directory "/var/cache/bind";

    // If there is a firewall between you and nameservers you want
    // to talk to, you may need to fix the firewall to allow multiple
    // ports to talk. See http://www.kb.cert.org/vuls/id/800113

    // If your ISP provided one or more IP addresses for stable
    // nameservers, you probably want to use them as forwarders.
    // Uncomment the following block, and insert the addresses replacing
    // the all-0's placeholder.

    // forwarders {
    //     0.0.0.0;
    // };

    //=====  

    // If BIND logs error messages about the root key being expired,  

    // you will need to update your keys. See https://www.isc.org/bind-keys  

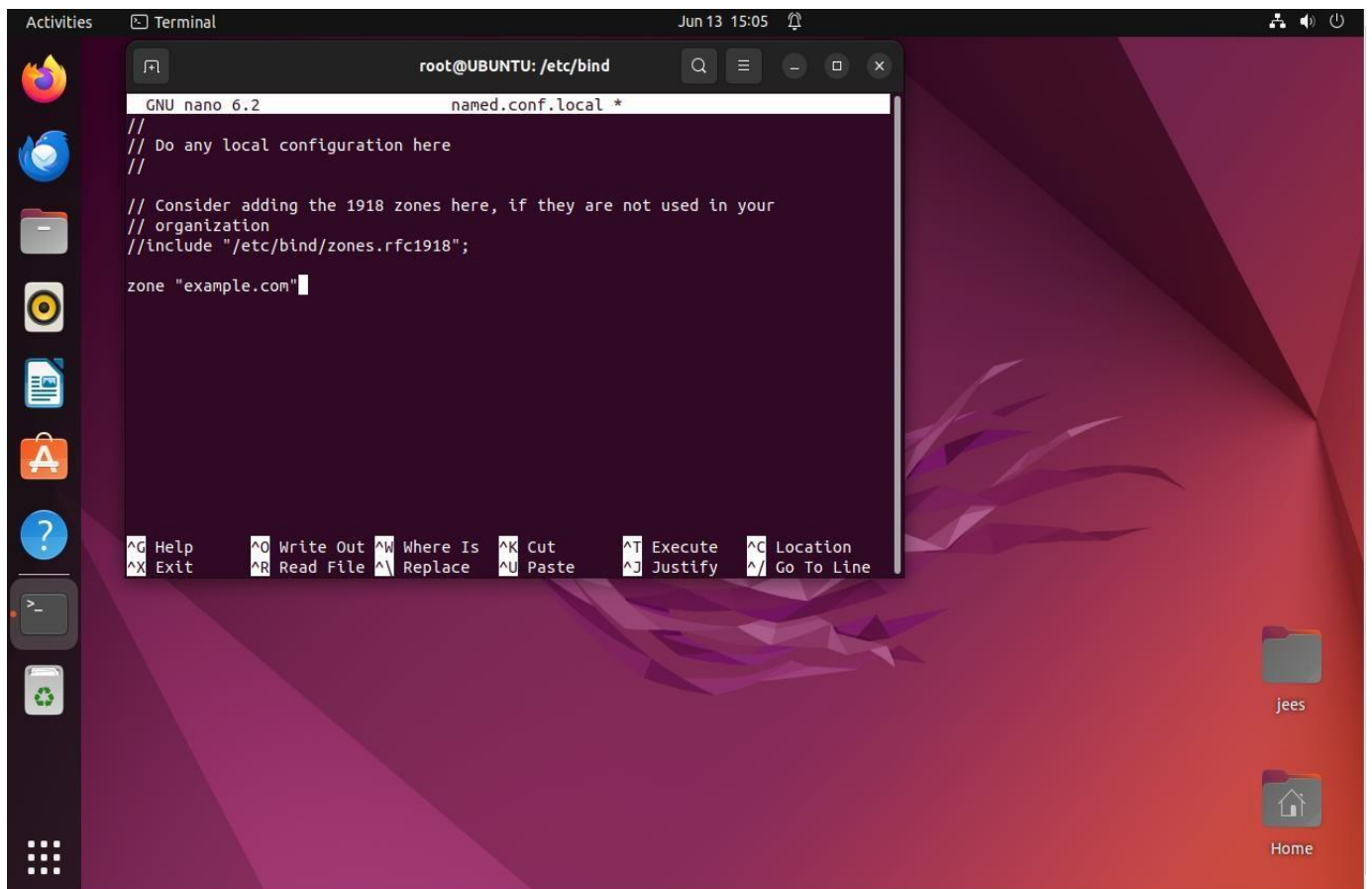
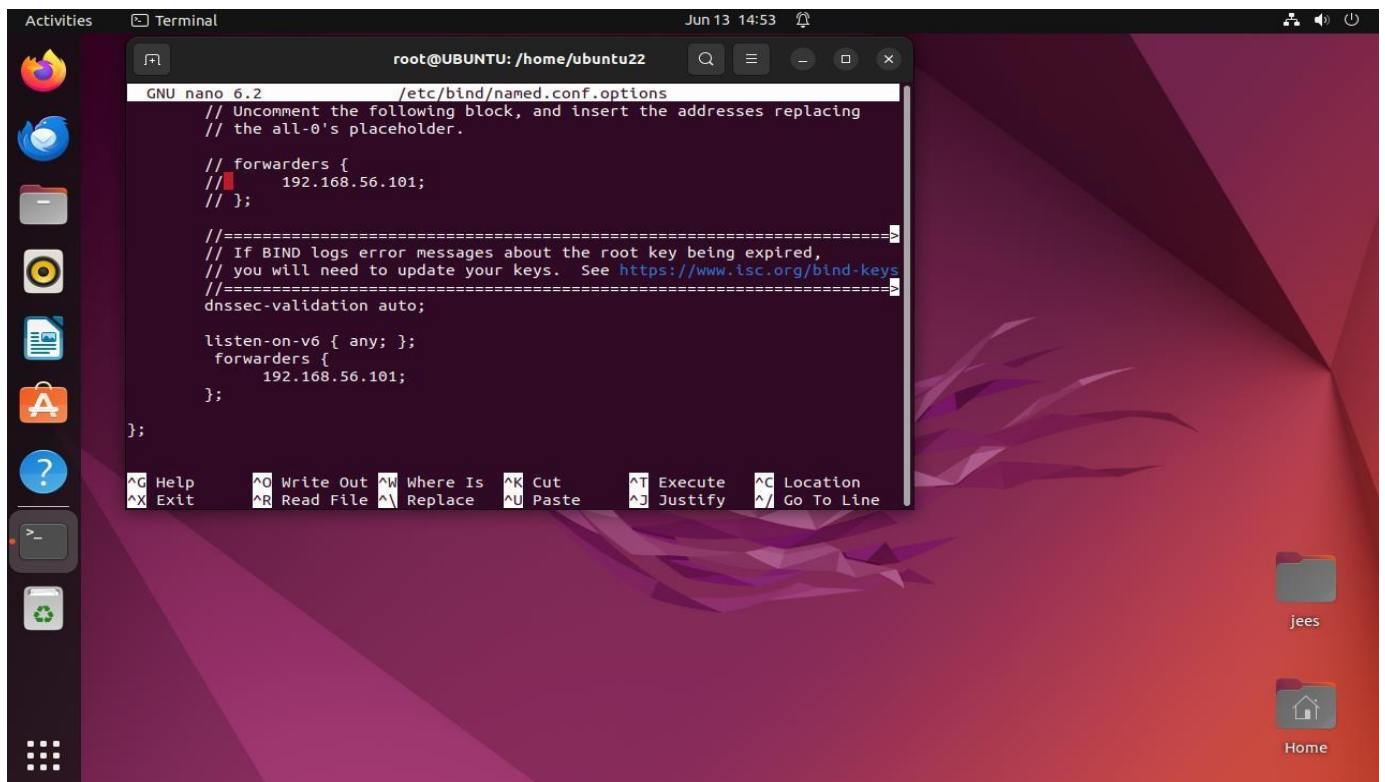
    //=====  

    dnssec-validation auto;

    listen-on-v6 { any; };
}
```

Read 24 lines

^O Write Out	^W Where Is	^K Cut	^T Execute	^C Location	M-U Undo	M-A Set Mark	M-T To Bracket
^R Read File	^_ Replace	^U Paste	^J Justify	^_ Go To Line	M-E Redo	M-G Copy	^Q Where Was




```
Activities Terminal Jun 13 14:54
root@UBUNTU: /home/ubuntu22

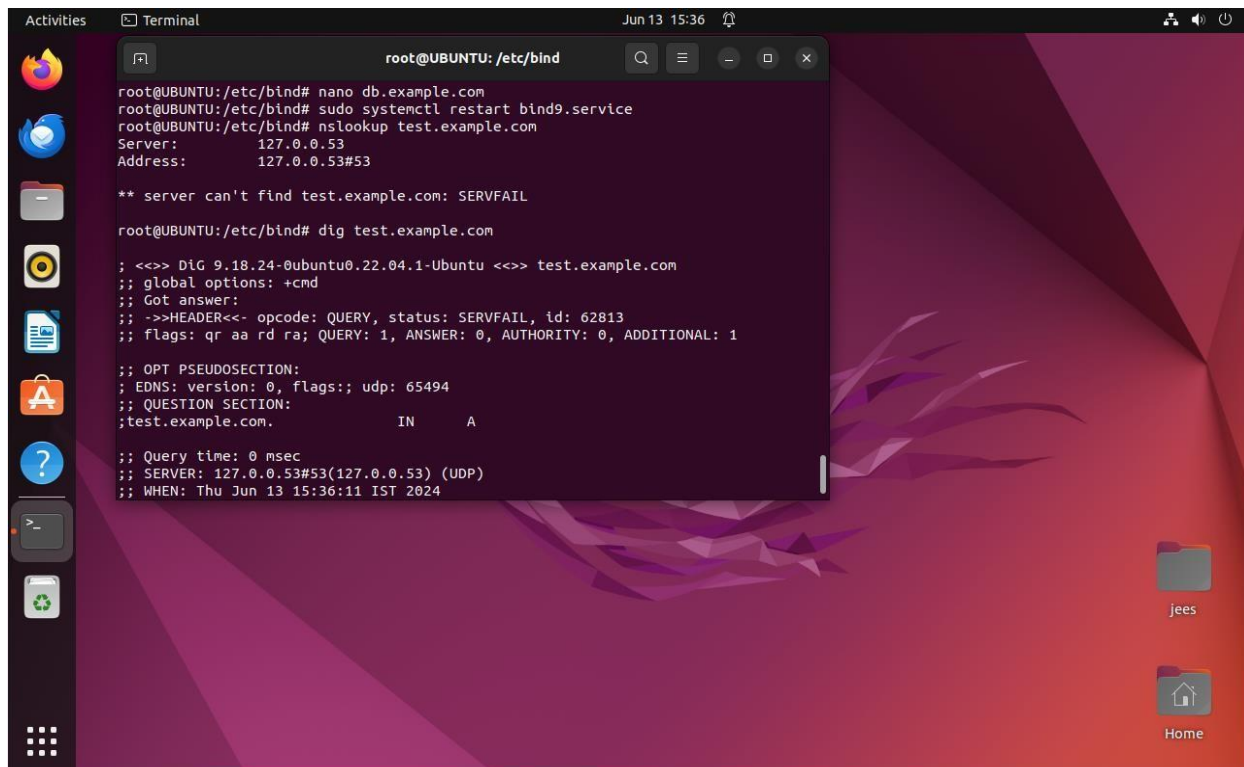
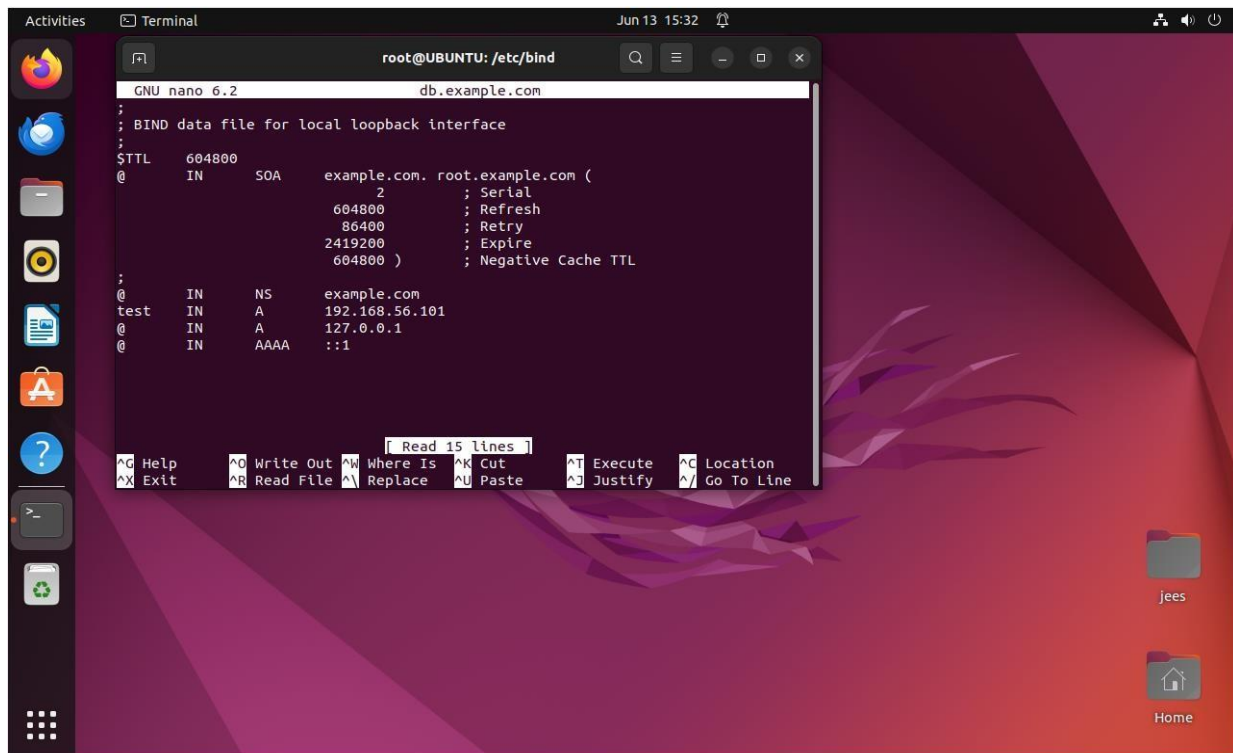
inet 192.168.56.101 netmask 255.255.255.0 broadcast 192.168.56.255
inet6 fe80::babf:b255:e5ba:c37c prefixlen 64 scopeid 0x20<link>
ether 08:00:27:0e:3c:4f txqueuelen 1000 (Ethernet)
RX packets 154003 bytes 51253498 (51.2 MB)
RX errors 0 dropped 2072 overruns 0 frame 0
TX packets 10625 bytes 1142219 (1.1 MB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
inet 127.0.0.1 netmask 255.0.0.0
inet6 ::1 prefixlen 128 scopeid 0x10<host>
loop txqueuelen 1000 (Local Loopback)
RX packets 1712 bytes 193578 (193.5 KB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 1712 bytes 193578 (193.5 KB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

root@UBUNTU: /home/ubuntu22# ^C
root@UBUNTU: /home/ubuntu22# nano /etc/bind/named.conf.options
root@UBUNTU: /home/ubuntu22# sudo systemctl restart bind9.service
root@UBUNTU: /home/ubuntu22# nano /etc/bind/named.conf.options
root@UBUNTU: /home/ubuntu22# nano /etc/bind/named.conf.options
root@UBUNTU: /home/ubuntu22# sudo systemctl restart bind9.service
root@UBUNTU: /home/ubuntu22#
```

```
Activities Terminal Jun 13 15:31
root@UBUNTU: /etc/bind

root@UBUNTU:/etc/bind# sudo systemctl restart bind9.service
Job for named.service failed because the control process exited with error code.
See "systemctl status named.service" and "journalctl -xeu named.service" for details.
root@UBUNTU:/etc/bind# nano named.conf.local
root@UBUNTU:/etc/bind# sudo systemctl restart bind9.service
root@UBUNTU:/etc/bind# nano /etc/bind/named.conf.options
root@UBUNTU:/etc/bind# sudo systemctl restart bind9.service
root@UBUNTU:/etc/bind# named-checkzone example.com
^Z
[1]+  Stopped                  named-checkzone example.com
root@UBUNTU:/etc/bind# nano dblocker
root@UBUNTU:/etc/bind# nano dblocal
root@UBUNTU:/etc/bind# nano db.local
root@UBUNTU:/etc/bind# nano db.local
root@UBUNTU:/etc/bind# cp db.local db.example.com
root@UBUNTU:/etc/bind# ls
bind.keys  db.empty      named.conf.default-zones  zones.rfc1918
db.0       db.example.com named.conf.local
db.127     db.local      named.conf.options
db.255     named.conf    rndc.key
root@UBUNTU:/etc/bind# nano db.example.com
root@UBUNTU:/etc/bind# nano db.example.com
root@UBUNTU:/etc/bind#
```



```
Activities Terminal Jun 13 15:55 root@UBUNTU: /etc
root@UBUNTU:/etc# nano resolv.conf
root@UBUNTU:/etc# dig test.example.com

;<<> DiG 9.18.24-0ubuntu0.22.04.1-Ubuntu <<> test.example.com
;; global options: +cmd
;; Got answer:
;; ->HEADER<- opcode: QUERY, status: NOERROR, id: 44742
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
;; EDNS: version: 0, flags:; udp: 1232
;; COOKIE: 2bba6127b011dad30100000666ac90f2bfabf53e83711e2 (good)
;; QUESTION SECTION:
;test.example.com.                IN      A

;; ANSWER SECTION:
test.example.com.                604800  IN      A      192.168.56.101

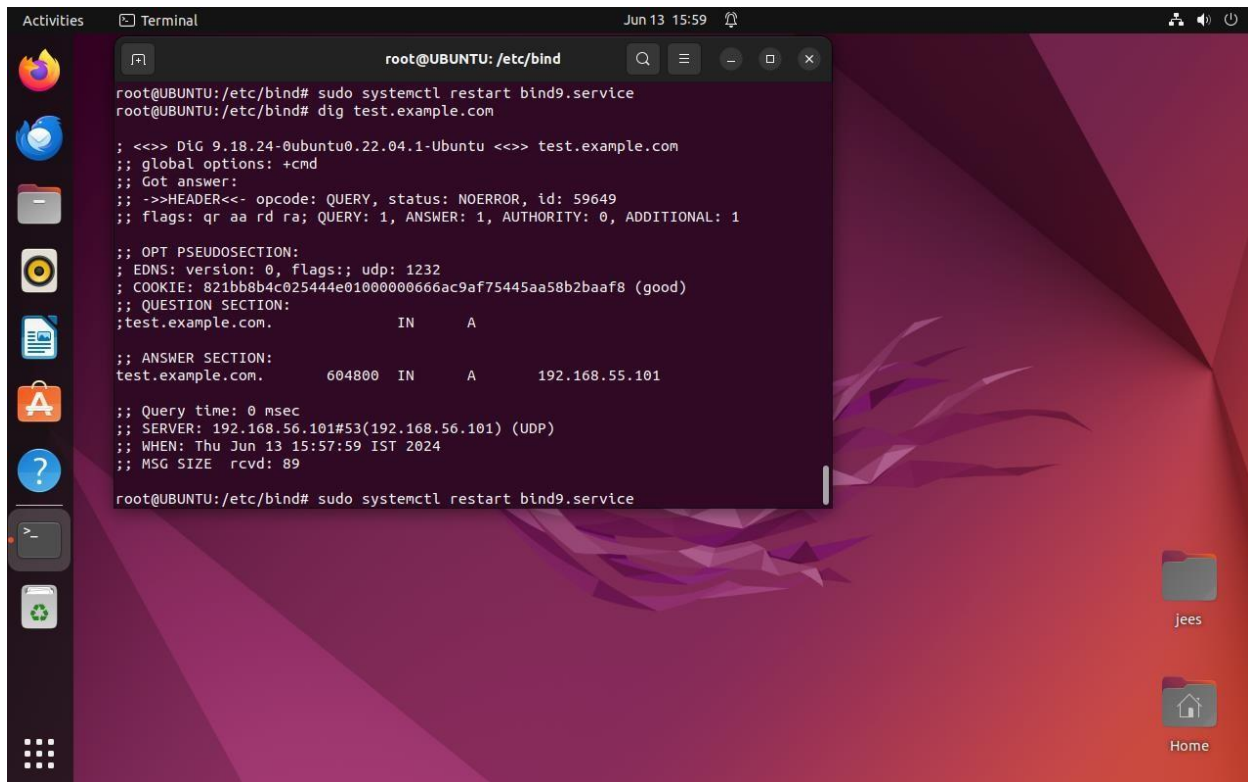
;; Query time: 0 msec
;; SERVER: 192.168.56.101#53(192.168.56.101) (UDP)
;; WHEN: Thu Jun 13 15:55:19 IST 2024
;; MSG SIZE rcvd: 89

root@UBUNTU:/etc#
```

```
Activities Terminal Jun 13 15:56 root@UBUNTU: /etc
GNU nano 6.2 resolv.conf
# /etc/resolv.conf and seeing this text, you have followed the symlink.
#
# This is a dynamic resolv.conf file for connecting local clients to the
# internal DNS stub resolver of systemd-resolved. This file lists all
# configured search domains.
#
# Run "resolvectl status" to see details about the uplink DNS servers
# currently in use.
#
# Third party programs should typically not access this file directly, but only
# through the symlink at /etc/resolv.conf. To manage man:resolv.conf(5) in a
# different way, replace this symlink by a static file or a different symlink.
#
# See man:systemd-resolved.service(8) for details about the supported modes of
# operation for /etc/resolv.conf.

nameserver 192.168.56.101
options edns0 trust-ad
search .

^G Help      ^O Write Out ^W Where Is  ^K Cut       ^T Execute  ^C Location
^X Exit      ^R Read File ^I Replace   ^U Paste     ^J Justify  ^_ Go To Line
```

The screenshot shows a terminal window titled 'root@UBUNTU: /etc/bind' with a search bar and window controls. The terminal output shows the following sequence of commands and their results:

```
root@UBUNTU:/etc/bind# sudo systemctl restart bind9.service
root@UBUNTU:/etc/bind# dig test.example.com

; <<>> DiG 9.18.24-0ubuntu0.22.04.1-Ubuntu <<>> test.example.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 59649
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
;; EDNS: version: 0, flags:; udp: 1232
;; COOKIE: 821bb8b4c025444e01000000666ac9af75445aa58b2baaf8 (good)
;; QUESTION SECTION:
;test.example.com.                IN      A

;; ANSWER SECTION:
test.example.com.        604800  IN      A      192.168.55.101

;; Query time: 0 msec
;; SERVER: 192.168.56.101#53(192.168.56.101) (UDP)
;; WHEN: Thu Jun 13 15:57:59 IST 2024
;; MSG SIZE rcvd: 89

root@UBUNTU:/etc/bind# sudo systemctl restart bind9.service
```

The desktop background is a red and purple geometric pattern. On the left is a vertical dock with icons for Firefox, Telegram, Files, GNOME Software, LibreOffice Writer, App Store, a question mark, and a terminal icon. On the right, there are desktop icons for 'jees' and 'Home'.

All the commands have been executed and the output has been obtained successfully.